Remarks

Claims 81-126 are pending in the subject application including claims 81-90, 96-99, 111-118 and 124 which were withdrawn from consideration due to a previous restriction requirement. Claim 126 is being added by amendment and claims 92-93, 95, and 109 are being cancelled without prejudice.

Rejections under 35 U.S.C. §112, first paragraph

In the Office Action, claims 91-95, 100-110 and 119-123 were rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. The macroinitiators of the subject application comprise a polymer block and an polymerization initiation group chemically bonded to the polymer block.

The claims all find support in the specification as filed. The formation of macroinitiators of the claims is discussed, for example, on page 30, line 27. This section describes the formation of atom transfer radical polymerization (ATRP) initiators by first forming a polymer block by a different, non-ATRP, polymerization process. This process may be conducted utilizing an initiator for the different polymerization process that also comprises a radically transferable atom or group. See page 31, lines 19-26, specifically, for claims 91, 94, 100, 101, and 103. Support may be found on page 31, lines 24 and 25. Claims 91 and 102, for example, are supported by the disclosure from page 40, line 23 to page 41, line 3, and Examples 262-267, as well as elsewhere in the specification. Claim 94 is specifically supported in Example 265 and on page 40, line 23 to page 41, line 11. Claims 104 and 105 are supported from page 39, line 25 to page 40, line 22 and Examples 210-213. The macroinitiator for bottle brush, as described in claims 106, 108, and 110, are supported in Example 283 and page 38,

line 22 to page 39, line 24. Claims 119-123 may be supported by the disclosure on page 30, line 27 to page 33, line 13.

The citations to the specification indicated in this Response are merely examples of the disclosures that support the claims. Additional support for the claims may be found elsewhere in the specification as well.

Rejections under 35 U.S.C. §112, first paragraph

The Examiner has rejected claims 91-95, 100-110, and 119-123 under 35 U.S.C. § 112, second paragraph, because in his opinion certain claim terms render the claims indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The objected to claim terms include "derived from", "free radically transferable atom or group", certain typographical errors, "based", "transfer agent" and "residing on". Applicants have amended or cancelled claims to address each of the Examiner's 35 U.S.C. §112, second paragraph rejections, except as indicated below.

The claims of the subject application including the phrases "radically transferable atom or group", "transfer agent" and "capable of" have been rejected as indefinite. Applicants respectfully disagree with these rejections. Claims are not necessarily considered indefinite because they use functional language or because the claim terms describe what the initiators are capable of doing. The Manual for Patent Examining Procedure ("MPEP") states clearly a "functional limitation is **often** used in association with an **element**, ingredient, or step of a process to define a particular **capability** or purpose that is served by the recited element, ingredient or step." MPEP § 2173.05(g) (Emphasis added.). The MPEP provides:

> A functional limitation is an attempt to define something by what it does, rather than what it is (e.g., as evidenced by its specific

> structure or specific ingredients). The is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself render a claim improper. *Id.*

The phrases "radically transferable atom or group" or "capable of" do not in themselves render a claim improper. The claims have been improperly rejected based upon solely on being, in the Examiner's opinion, functional limitations. As shown above, the MPEP instructs that functional limitations may be used to define a "particular capability" of an element, as used in the claims of the subject application. The standard to be used for examination of a functional limitation is provided in the same section of the MPEP, § 2173.05(g), as follows:

> A functional limitation must be evaluated and considered, just like any other limitation of the claims, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is being used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element or ingredient or step. *Id.*

The elements and limitations of the claims of the subject application should be evaluated and considered for what they fairly convey to a person of ordinary skill in the pertinent art. The limitation, "radically transferable atom or group" and "transfer agent", should be considered and evaluated for what it fairly conveys to one skilled in the pertinent art. Earlier articles and patent applications which are incorporated by reference into the subject application describe in detail a radically transferable atom or group. Particularly, U.S. Patent Applications 08/414,415 (now U. S. Patent No. 5,763,548 (hereinafter "'548")) and 08/559,309 (now U. S. Patent No.

5,807,937(hereinafter "'937")) define in detail radically transferable atom or groups for interpretation of the claims of the subject application. Particularly in '548, the description of radically transferable atoms or groups is in column 8, line 50 to column 9, line 33 and in '937, radically transferable atoms or groups are described from column 17, line 4 to column 18, line 55, as well as elsewhere in each of the specifications. It is also described in the applications, that the radically transferable atom or group is similar to the radically transferable atom or group in the conventional atom transfer radical addition reaction. Atom transfer radically addition reactions are well known and described in the art. (For a discussion of the similarity of ATRA and ATRP, see '548 in the Background of the Invention and, for a further discussion in the Description of the Invention, see column 24, line 28 to column 25, line 9, for example. To be fair, it should be determined one skilled in the art would clearly understand the metes and bounds of the functional limitation "radically transferable atom or group" in the claims.

Claim 122 also includes the limitation that the macroinitiator comprises a polymer block having monomers capable of being polymerized by a process selected from the group consisting of a cationic, an anionic, metathesis, ring opening and coordination polymerization process. One skilled in the art understands initiation of these well known polymerization processes and the transfer agents that may be used in them. These limitations do not need to be further described. In fact, the MPEP provides that "not everything necessary to practice the invention need be disclosed. In fact, what is well-known is best omitted." See MPEP § 2164.08. Monomers capable of being polymerized by each of the polymerization processes included as limitations in the claim are well described and known in the art. In addition, the specification gives specific examples of these monomers.

Therefore, the functional limitations of the claims of the subject application fairly convey to one skilled in the art the metes and bounds of the claimed invention. The specification additionally describes how to use the initiator on page 31, lines 19-26 and how to

prepare a dual functional initiator is described in Example 270, for example, the dual functional initiator is used to prepare polystyrene macroinitiator by conducting a free radical polymerization in, for example, Example 271 and Example 272 further teaches how to use the macroinitiator to conduct an ATRP adding monomers to the macroinitiator of claim 271. Additionally, example 275 teaches the use of a macroinitiator prepared by ionic ring opening polymerization in an ATRP process. Other examples also teach additional aspects of the subject matter if the claims of the subject application. The advantage of using dual functional initiators for the formation of copolymers is that the there are no intermediate steps between the polymerization process that requires functionalization of the macroinitiator to form an initiation site for the second polymerization process. Since ATRP and the non-ATRP polymerization processes are well known in art, further description of there use is not needed to fulfill the enablement requirement. As stated above, "not everything necessary to practice the invention need be disclosed. In fact, what is well-known is best omitted." *Id.* Therefore, the claims are not excessively broad based on the disclosure. Reconsideration of the 35 U.S.C. § 112, second paragraph rejection is respectfully requested.

Rejections Based Upon Non-statutory Double-Patenting

Claims 91-95, 100-110, and 119-123 have been rejected under the judicially created doctrine of obviousness double-patenting as being unpatentable over claims 1-11 of United States Patent No. 6,538,091. Certain claims of United States Patent No. 6,538,091 relate to polymers comprising a polymer block having radically polymerizable monomers and which may also radically transferable atom or group. The claims of the subject application comprise different, nonobvious, polymer blocks than the claims of United States Patent No. 6,538,091.

Priority

The divisional ancestry has been amended as requested by the Examiner to include United States Patent No. 6,538,091.

Rejections under 35 U.S.C. §103(a)

The Examiner has rejected claims 91-95, 100-110 and 119-123 under 35 U.S.C. 103(a) as being unpatentable over any of United States Patent No. 5,510,307 issued to Narayanan et al. ("Narayanan"), United States Patent No. 5,763,548 issued to Matyjaszewski ("Matyjaszewski I"), United States Patent No. 5,789,487 issued to Matyjaszewski ("Matyjaszewski II") and United States Patent No. 5,807,937 issued to Matyjaszewski ("Matyjaszewski III"). Applicants disagree that Matyjaszewski I and Matyjaszewski II are prior art of the subject application. The priority date of the subject application is prior to the filing date of these granted patents.

Narayanan discloses the preparation of a mixture of a standard free radical initiators and a polymer/surfactant. The mixture is prepared then used to control the rate of diffusion of the initiator into an emulsion polymerization process. The initiator of Narayanan is not chemically bonded to the polymer. In column 2 line 50, it clearly states the initiator is mixed with the polymer using a mutual solvent. The solvent is subsequently removed providing a physical mixture of initiator and unattached polymer. Use of this mixture in an emulsion polymerization does not produce a block copolymer it merely allows slow diffusion of the initiator into the reaction mixture. The claims, as amended herein, clearly require the radically transferable atom or group to be chemically bonded to the polymer block.

Matyjaszewski I does not disclose macroinitiators comprising polymer blocks having monomer units as described in the subject application. Matyjaszewski I discloses sequential ATRP reactions. The subject application discloses and claims the use of non-ATRP polymerization mechanisms to produce ATRP macroinitiators. The initiation group for an atom

transfer radical polymerization cannot initiate an uncontrolled free radical polymerization. Therefore, Applicants respectfully submit that the prior art of record in the subject application do not teach, suggest, or motivate one skilled in the art to prepare the macroinitiators as claimed in the subject application.

CONCLUSIONS

Applicants have made a diligent effort to fully respond to the all the objections and rejections presented in the Office Action. Issuance of a Notice of Allowance at an early date are earnestly solicited. If the Examiner has any concerns regarding Applicants' present response, he is invited to contact Applicants' undersigned representative at the telephone number listed below so that those concerns may be expeditiously addressed.

Respectfully submitted,

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